Claims

1. A method of determining the time-varying absolute position of device in respect to a surface, the method comprising the steps of:

measuring at least one absolute position of the device in respect to the surface;

measuring a time-varying vector representing the movement of the device in respect to the surface; and

initialising the position of vector to the at least one absolute position measurement thereby measuring the absolute position of the vector and thus the time-varying absolute position of the device.

2. A method of determining the absolute position of a stroke made by a measurement device in respect to a surface, said surface having embedded thereon position encoding indicia, the method comprising the steps of:

detecting one or more position encoding indicia and thereby calculating at least one absolute position measurement of the device;

in conjunction with the aforementioned step, measuring the relative movement of the device in respect to the surface and thereby calculating a time-varying motion vector representing the movement of the device in respect to the surface; and

calculating the absolute location of the stroke in respect to the surface on the basis of at least one measurement of the absolute position in combination with the time-varying motion vector.

3. A method as claimed in either claim 1 or 2 where the detection of the absolute position is achieved by non-contact optical means.

4. A method as claimed in any preceding claim wherein the detection of the time-varying vector is achieved by means of a non-contact relative optical measurement.

5. A method as claimed in any preceding claim wherein the detection of the at least one absolute position is performed by imaging a glyph bed which is applied to the surface.

6. A method as claimed in claim 5 wherein the glyph bed is a machine-readable array of markings having absolute positions encoded therein.

7. A method as claimed in claim 5 or 6 wherein the glyph bed is invisible to the human eye or alternatively adapted to not substantially interfere with the appearance of the surface when viewed by the human eye.

8. A method as claimed in any one of claims 5 to 7 wherein the glyph bed is applied using ink which is visible in the infrared part of the spectrum.

9. A method as claimed in any preceding claim wherein the surface is overprinted with human-readable material in such a way as to obscure a portion of the glyph bed.

10. A method as claimed in any preceding claim wherein the detection of the relative position of the time-varying vector representing the movement of the device in respect to the surface is preferably measured using heterodyne or homodyne detection of non-doppler, non-speckle image signals derived from changes in the phase and/or the amplitude of reflection from an optical surface.

11. A method as claimed in any one of claims 1 to 10 wherein the detection of the relative position of the time-varying vector representing the movement of the device in respect to the surface is measured using a transducer-based arrangement.

12. A measurement device for determining the time-varying absolute position of the device in respect to a surface including:

a first measuring device arranged to determine at least one absolute position of the device in respect to the surface;

a second measuring device arranged to determine a time-varying vector representing the movement of the device in respect to the surface;

processing means adapted to initialise the position of vector to the at least one absolute position measurement and output a signal representing the absolute position of the vector and thus the time-varying absolute position of the device.

13. A measurement device for determining the absolute position of a stroke made by the measurement device in respect to a surface, said surface having embedded thereon position encoding indicia, the measurement device including:

a first measuring device arranged to detect one or more position encoding indicia and determine at least one absolute position measurement of the device;

in conjunction with the aforementioned step, a second measuring device arranged to measure the relative movement of the device in respect to the surface and output a time-varying motion vector representing the movement of the device in respect to the surface; and

processing means adapted to calculate the absolute location of the stroke in respect to the surface on the basis of the at least one measurement of the absolute position in combination with the measurement of the time-varying motion vector.

14. A device as claimed in either claim 12 or 13 wherein the device includes a first and second optical system, the first adapted to image a glyph bed arranged to encode the absolute position onto the surface, and the second optical system adapted to determine the relative movement of the device in respect to the surface.

15. A device as claimed in any one of claims 12 to 14 wherein the first and second optical systems is incorporated into a common optical sensing device.

16. A device as claimed in any one of claims 12 to 15 wherein the device has a pen form-factor or alternatively, a mouse form-factor.

17. A device as claimed in any one of claims 12 to 16 wherein the device includes additional support circuitry adapted to store stroke data.

18. A device as claimed in any one of claims 12 to 16 wherein the device includes communications circuitry adapted to transmit stroke data to a control means such as a computer.

19. A device as claimed in any one of claims 12 to 18 wherein the device operates by buffering the stroke data for user-activated upload, or communicate the stroke data in real-time, or be responsive to a users command to upload stroke data to a control means.

20. A method as claimed in any one of claims 1 to 11 further including the step of, where the detection of absolute stroke position is interrupted, attempting to interpolate across the interrupted area.

21. A method as claimed in any one of claims 1 to 11 and 20 further including the step of sanity checking interpolation and stroke reconstruction based on the statistically possible locations of strokes applied to the surface.

22. A method as claimed in any one of claims 1 to 11 and 20 to 21 further including the step of sanity checking absolute position measurements in respect of the sequence of stroke detection events of a surface by reference to user ergonomics, physical size of the surface, type of stroke applied or the speed of application of the stroke.

24. A method as claimed in any one of claims 1 to 12 and 21 to 23 further including the step of providing feedback to a user as to whether the stroke detection is successful or not, preferably in real time.

25. A method as claimed in any one of claims 1 to 12 and 21 to 24 the method adapted to detect the absolute position of a plurality of strokes, said strokes constituting writing, wherein sanity checking of the absolute position detection is performed based on a forward looking probabilistic algorithm responsive to the physical writing environment and process.